

ABSTRACT

1 A smaller electrode layer of an upper electrode is formed on a surface
2 of a free magnetic layer. A domain controlling film of an insulating material is formed
3 adjacent to the smaller electrode layer on the surface of the free magnetic layer.
4 Magnetization of the free magnetic layer is oriented in a single direction based on
5 magnetic exchange coupling between the domain controlling film and the free magnetic
6 layer. An electric connection is established between the free magnetic layer and the
7 upper electrode only through the smaller electrode layer. The path of a sensing current
8 can be reduced in the free and a pinned magnetic layer. A higher sensitivity can thus be
9 obtained in the CPP structure magnetoresistive element. Effective magnetic core width
10 can also be reduced in the CPP structure magnetoresistive element.